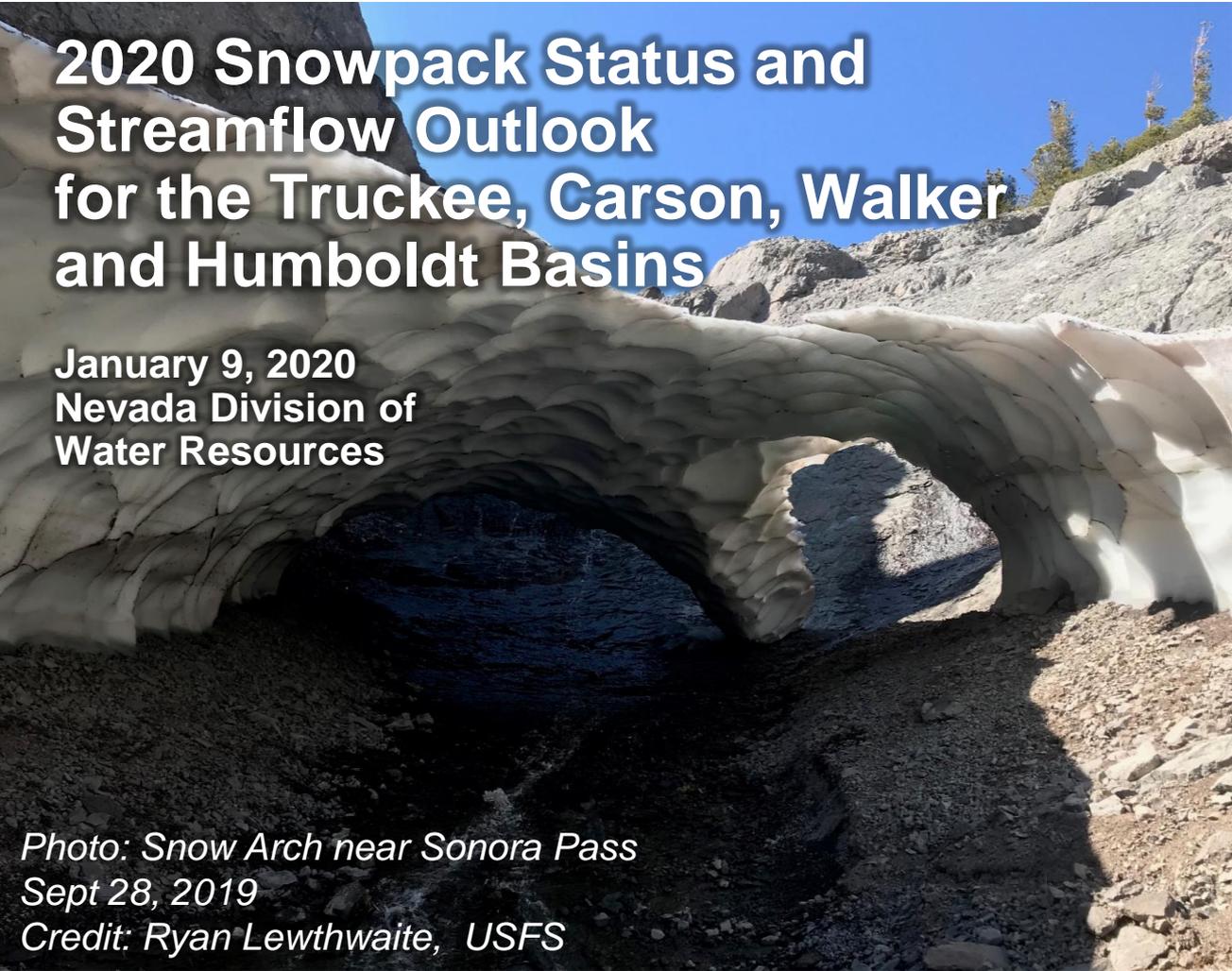




United States Department of Agriculture

# 2020 Snowpack Status and Streamflow Outlook for the Truckee, Carson, Walker and Humboldt Basins

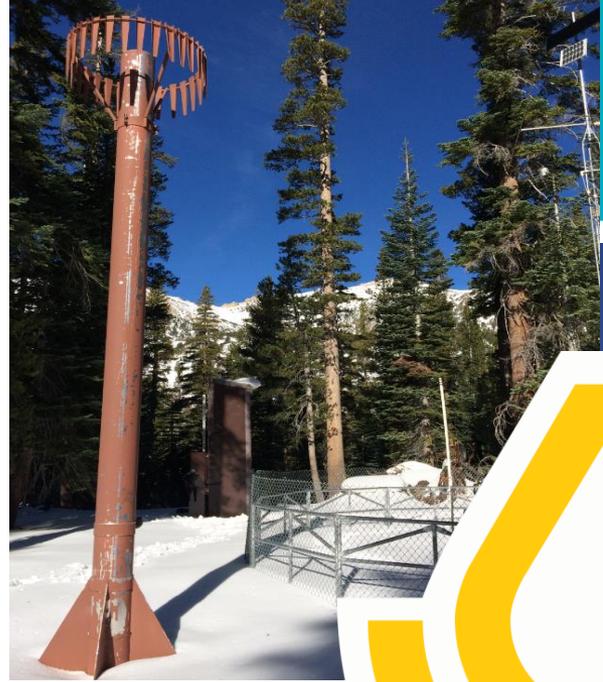
January 9, 2020  
Nevada Division of Water Resources



*Photo: Snow Arch near Sonora Pass  
Sept 28, 2019  
Credit: Ryan Lewthwaite, USFS*

Jeff Anderson  
Nevada NRCS Snow Survey

(775) 834-0913  
jeff.anderson@usda.gov



Natural Resources Conservation Service

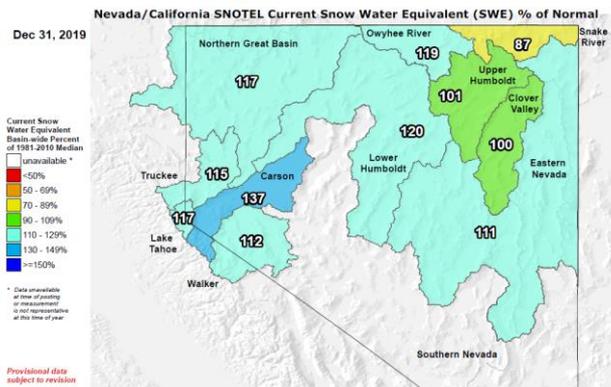
[www.nv.nrcs.usda.gov/snow](http://www.nv.nrcs.usda.gov/snow)

# New for 2020 - Updated groups to standardize calcs between all basin products

## Daily Update Report

California/Nevada SNOTEL Snow/Precipitation Update Report							
Based on Mountain Data from NRCS SNOTEL Sites							
**Provisional data, subject to revision**							
Data based on the first reading of the day (typically 00:00) for Tuesday, December 31, 2019							
Basin Site Name	Elev (ft)	Snow Water Equivalent			Water Year-to-Date Precipitation		
		Current (in)	Median (in)	Pct of Median	Current (in)	Average (in)	Pct of Average
<b>LAKE TAHOE</b>							
Mt Rose Ski Area	8801	16.1	13.5	119	17.9	18.4	97
Heavenly Valley	8534	7.4	8.7	85	9.4	10.5	90
Carson Pass	8360	14.0	9.3 <sub>a</sub>	151	13.6	15.3 <sub>a</sub>	89
Squaw Valley G.C.	8013	16.3	16.8	97	15.1	23.4	65
Marlette Lake	7884	9.5	7.5	127	10.4	10.9	95
Hagens Meadow	7742	8.0	5.2	154	8.3	10.1	82
Echo Peak	7653	15.6	13.8	113	16.3	22.0	74
Rubicon #2	7619	9.6	7.9	122	10.5	14.1	74
Tahoe City Cross	6797	6.5	4.9	133	11.3	12.6	90
Ward Creek #3	6745	12.2	10.1	121	19.6	24.9	79
Fallen Leaf	6242	2.1	2.5	84	9.2	11.4	81
<b>Basin Index (%)</b>				<b>117</b>			<b>82</b>

## Daily Basin GIS Maps



GIS maps are static once created

## Monthly Reports

USDA United States Department of Agriculture  
Natural Resources Conservation Service

### Nevada Water Supply Outlook Report

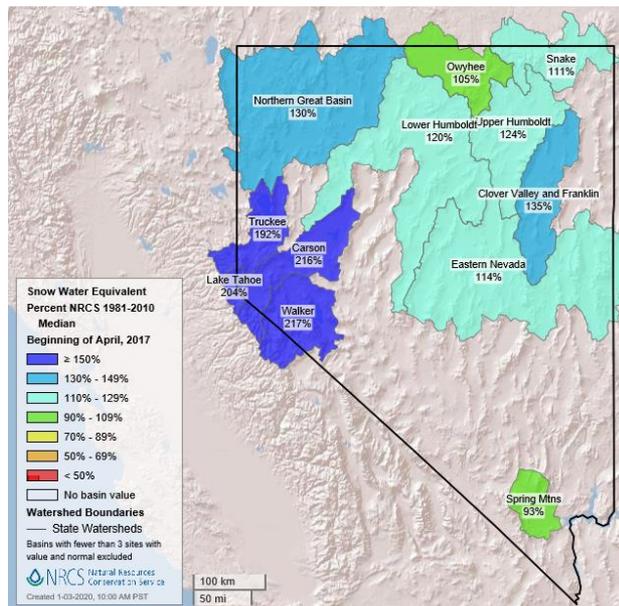
April 1, 2019

Rainbow Canyon SNOTEL taken 3/22/19 by Jim Hurja, USFS

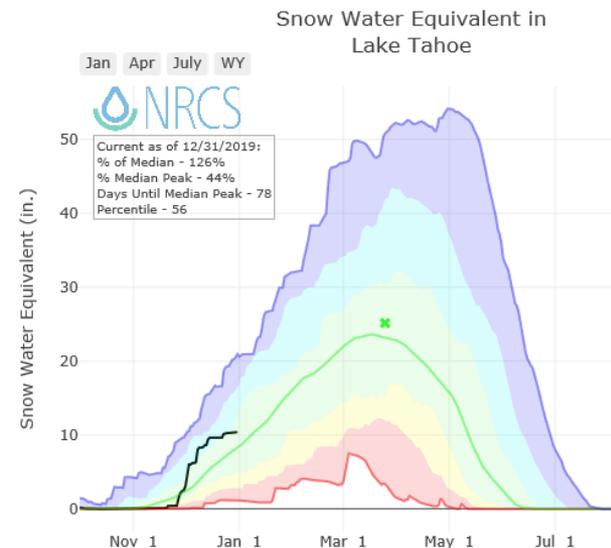
#### Big Winter North to South

April 1 snowpack across northern Nevada and the Eastern Sierra are 143-193% of median, but this year's highest snowpack percentage is found down south in the Spring Mountains, home to Mt. Charleston. Rainbow Canyon SNOTEL (pictured above) maxed out with snow 54 inches deep, containing 26 inches of water. This site was installed in 2008 along with two other nearby SNOTEL sites. Data since installation ranks 2019 second best, a bit behind 2011. These sites don't have enough years of data to produce meaningful gaugals from which to calculate a percent of median, however three snow courses in the area have data going back to 1941. Seth Shanahan and Greg French, ski patrollers at Lee Canyon Resort, volunteer to measure these snow courses. This month's measurements score the snowpack in the Spring Mountains at 268% of median! This ranks 9<sup>th</sup> highest since 1941. Most of Las Vegas' water comes from the Colorado River and there is more good news there. Snowpacks for the entire Colorado River basin above Glen Canyon Dam are currently 134% of median which is one of its best April 1 snowpacks in the SNOTEL era.

## Interactive Map (soon)



## Interactive Basin Charts (soon)

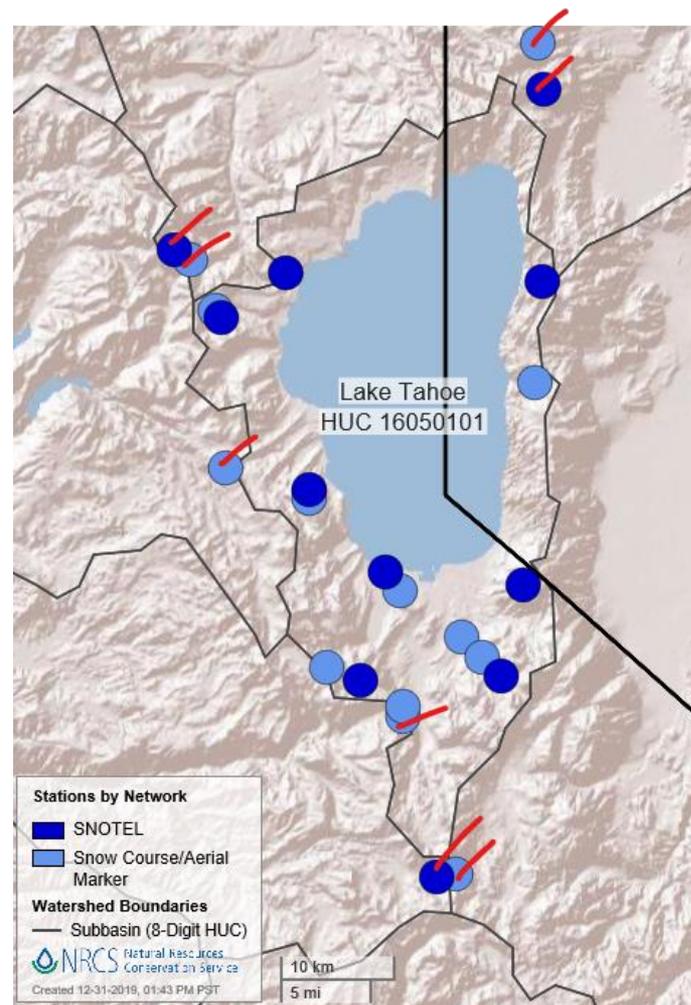


## Example – Additions made to Lake Tahoe Basin Group

Lake Tahoe Basin	Network	Elevation (ft)
Mount Rose	SC	9200
Mt Rose Ski Area	SNOTEL	8801
Heavenly Valley	SNOTEL	8534
Upper Carson Pass	SC	8500
Carson Pass	SNOTEL	8360
Lake Lucille	SC	8188
Rubicon #1	SC	8100
Squaw Valley G.C.	SNOTEL	8013
Marlette Lake	SNOTEL	7884
Hagans Meadow	SNOTEL	7742
Squaw Valley #2	SC	7694
Echo Peak	SNOTEL	7653
Rubicon #2	SNOTEL	7619
Rubicon Peak 2	SC	7577
Lost Corner Mountain	SC	7500
Echo Summit	SC	7450
Lake Audrain	SC	7300
Freel Bench	SC	7132
Ward Creek #2	SC	7000
Glenbrook #2	SC	6966
Tahoe City Cross	SNOTEL	6797
Ward Creek #3	SNOTEL	6745
Richardsons #2	SC	6553
Truckee, Upper	SC	6396
Fallen Leaf	SNOTEL	6242

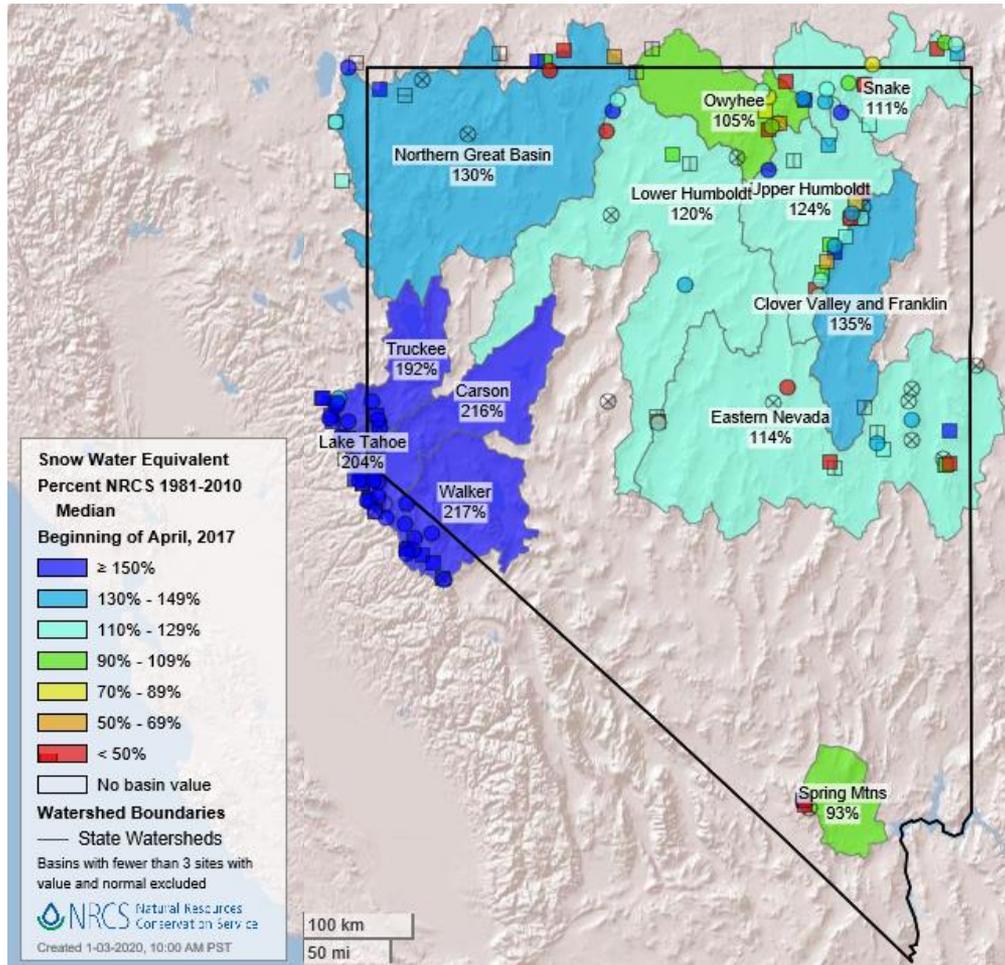
Long-POR  
SNOTEL and  
snow courses  
At higher-elev  
around  
perimeter.

Long-POR  
CA-DWR  
snow courses  
between  
7300-7600ft.



For other basins see **2020 Basin Group Update** on NV Snow Survey homepage  
<https://www.nrcs.usda.gov/wps/portal/nrcs/main/nv/snow/>

# Coming Soon – Updated Interactive Map State Specific Basin Polygons



## Interactive Map Basin Options

Map Mode:

Station Inventory	Station Conditions
Basin Conditions	Station/Basin Conditions

Conditions

- ▶ Element
- ▶ Parameter
- ▶ Date, Frequency, and Duration
- ▼ Basin Display

Basin Type

- Region (2-Digit HUC)
- Subregion (4-Digit HUC)
- Basin (6-Digit HUC)
- Subbasin (8-Digit HUC)

State-Specific Basins

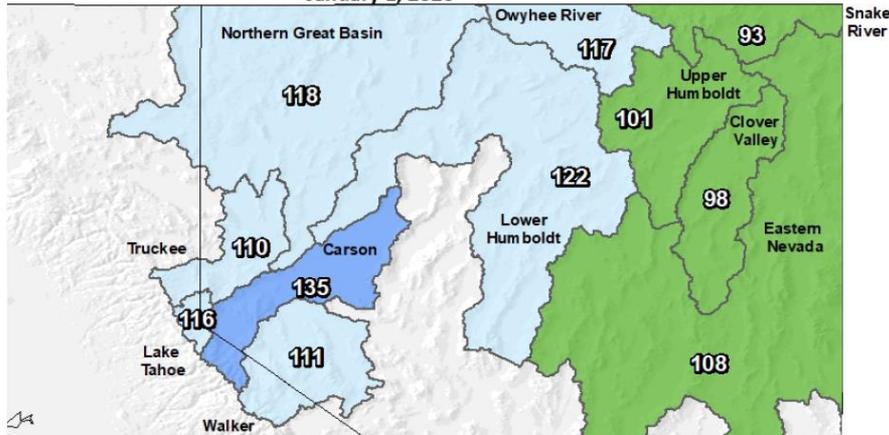
- Arizona
- Colorado
- Idaho
- Montana
- Nevada
- New Mexico
- Oregon
- Washington
- Wyoming

Basin Options

- Include Associated Outside Stations

iMap isn't static, it uses database to get corrected data.  
iMap has ability to see station and basin conditions together

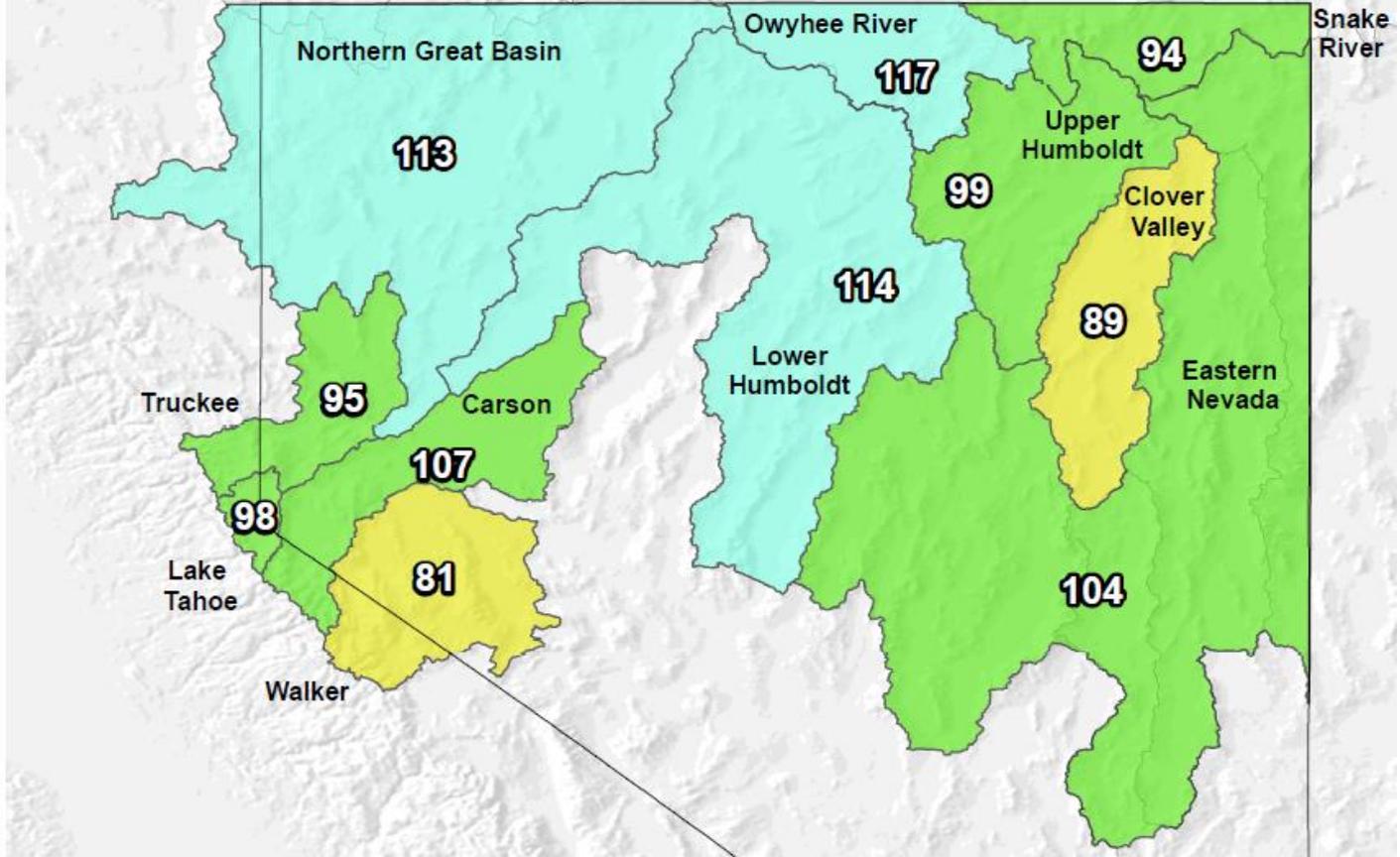
Nevada & Eastern Sierra  
Percent of Median Snowpack  
January 1, 2020



# 2020 Snowpack

Nevada/California SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Jan 08, 2020

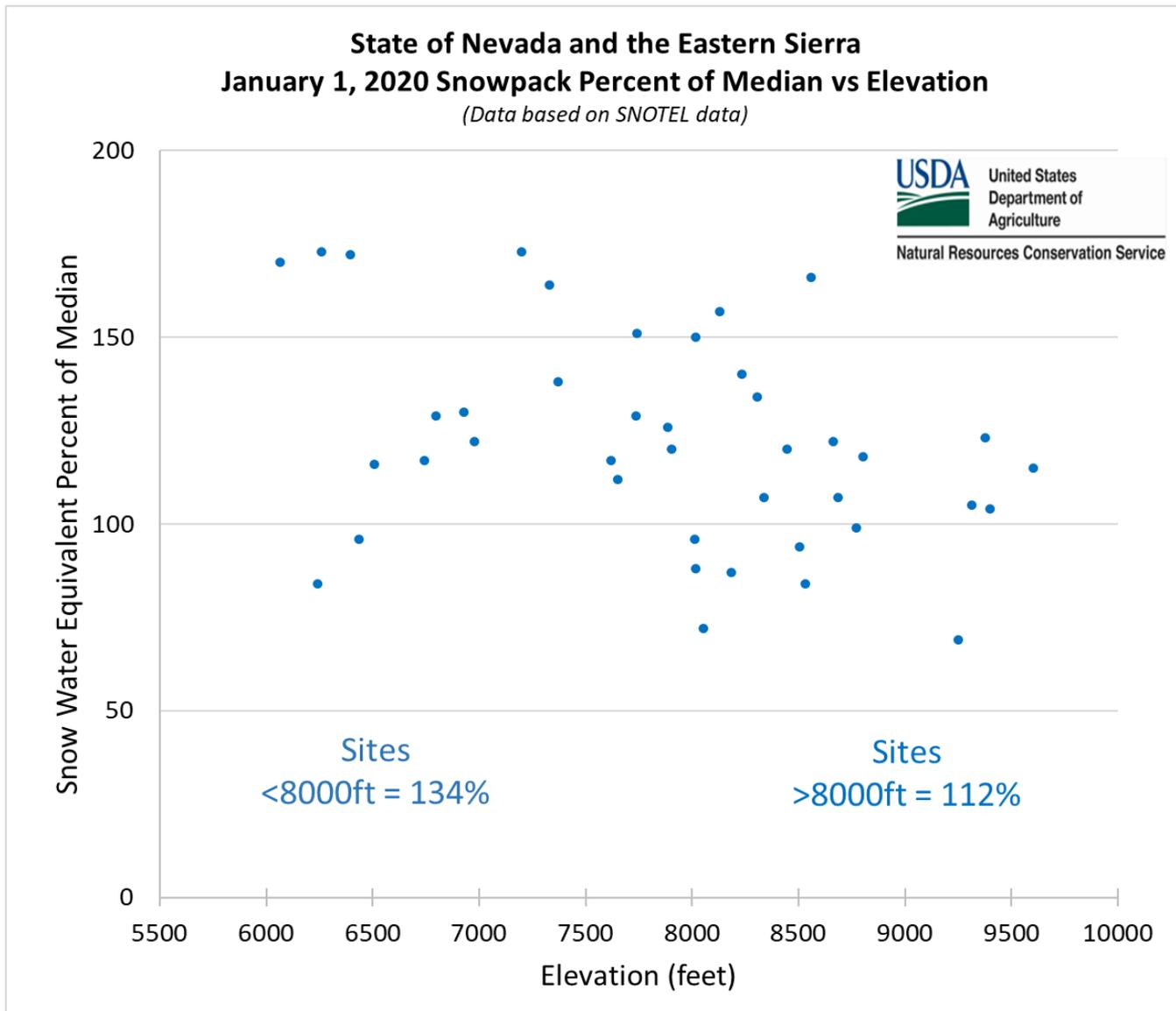


Current Snow Water Equivalent Basin-wide Percent of 1981-2010 Median

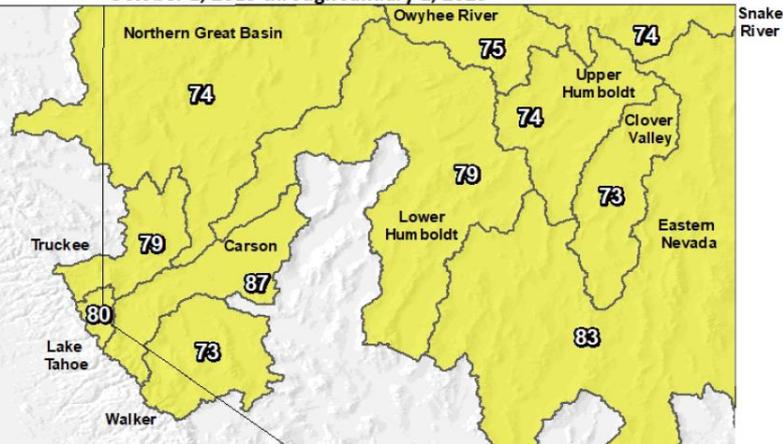
- unavailable \*
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >=150%

\* Data unavailable at time of posting or measurement is not representative at this time of year

# Jan 1 snowpack is well developed across all elevations



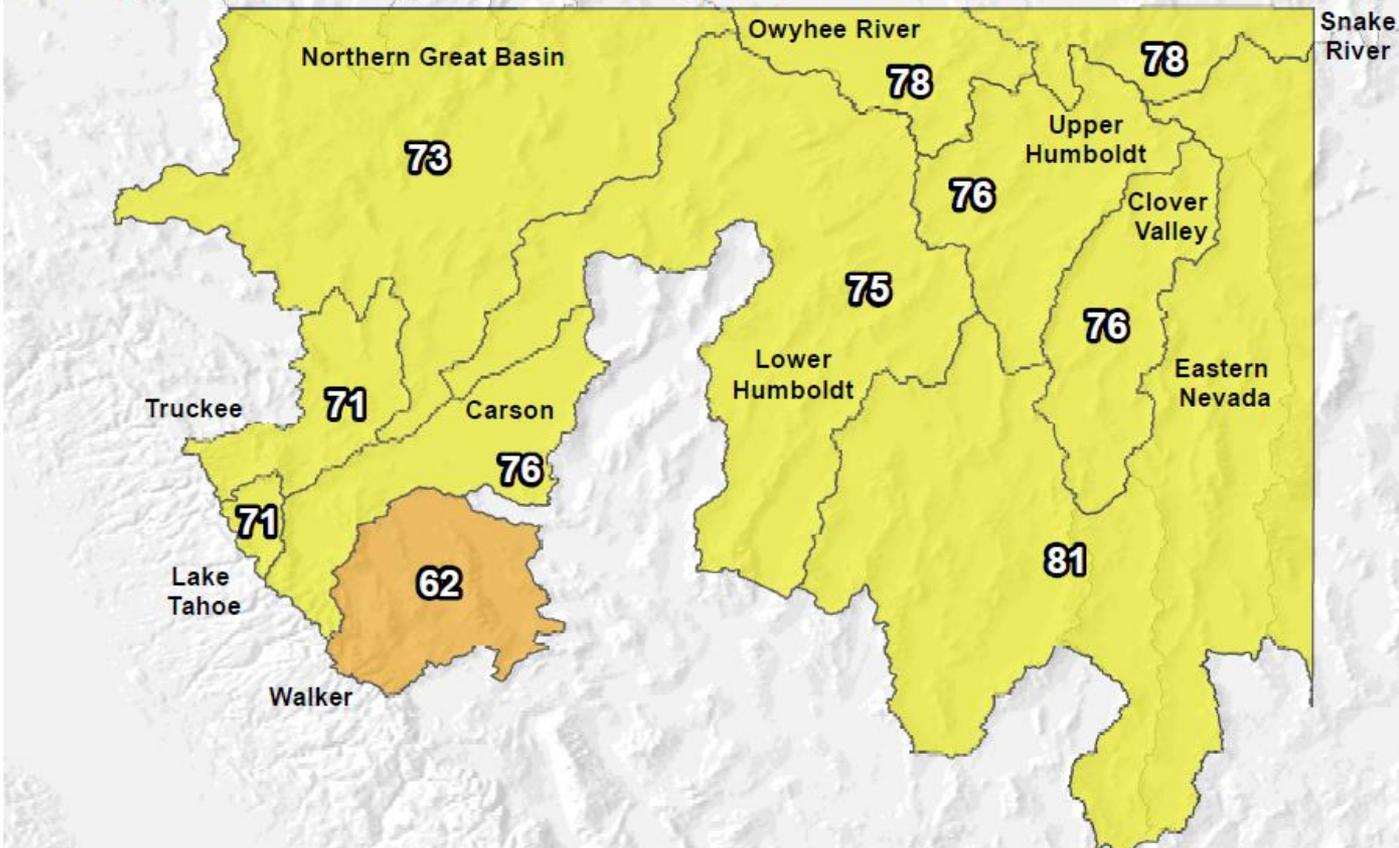
Water Year to Date Precipitation  
October 1, 2019 through January 1, 2020



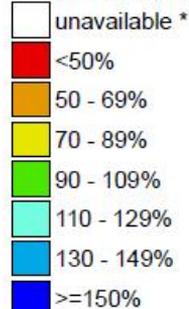
# 2020 Water Year Precipitation

Nevada/California SNOTEL Water Year (Oct 1) to Date Precipitation % of Normal

Jan 08, 2020

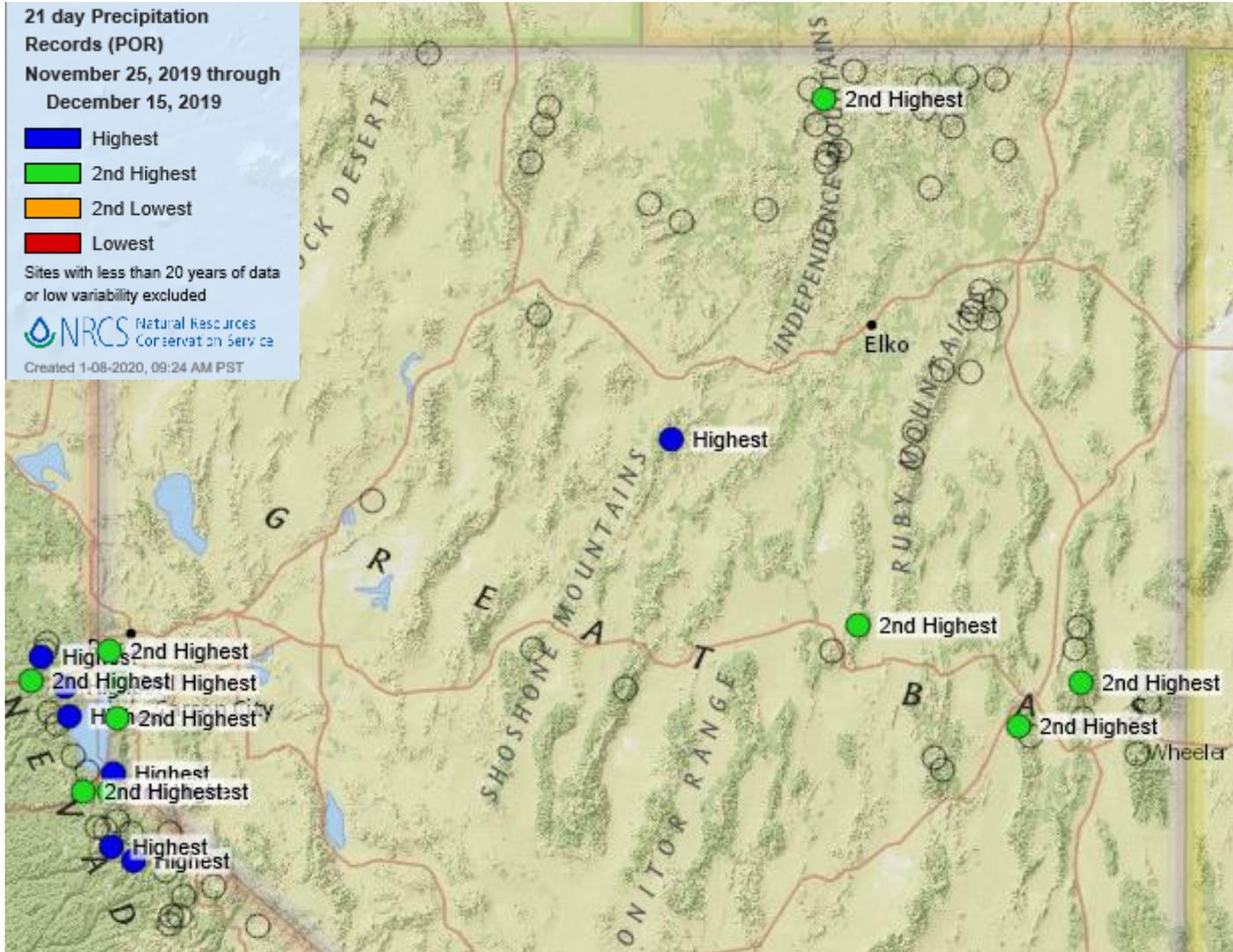


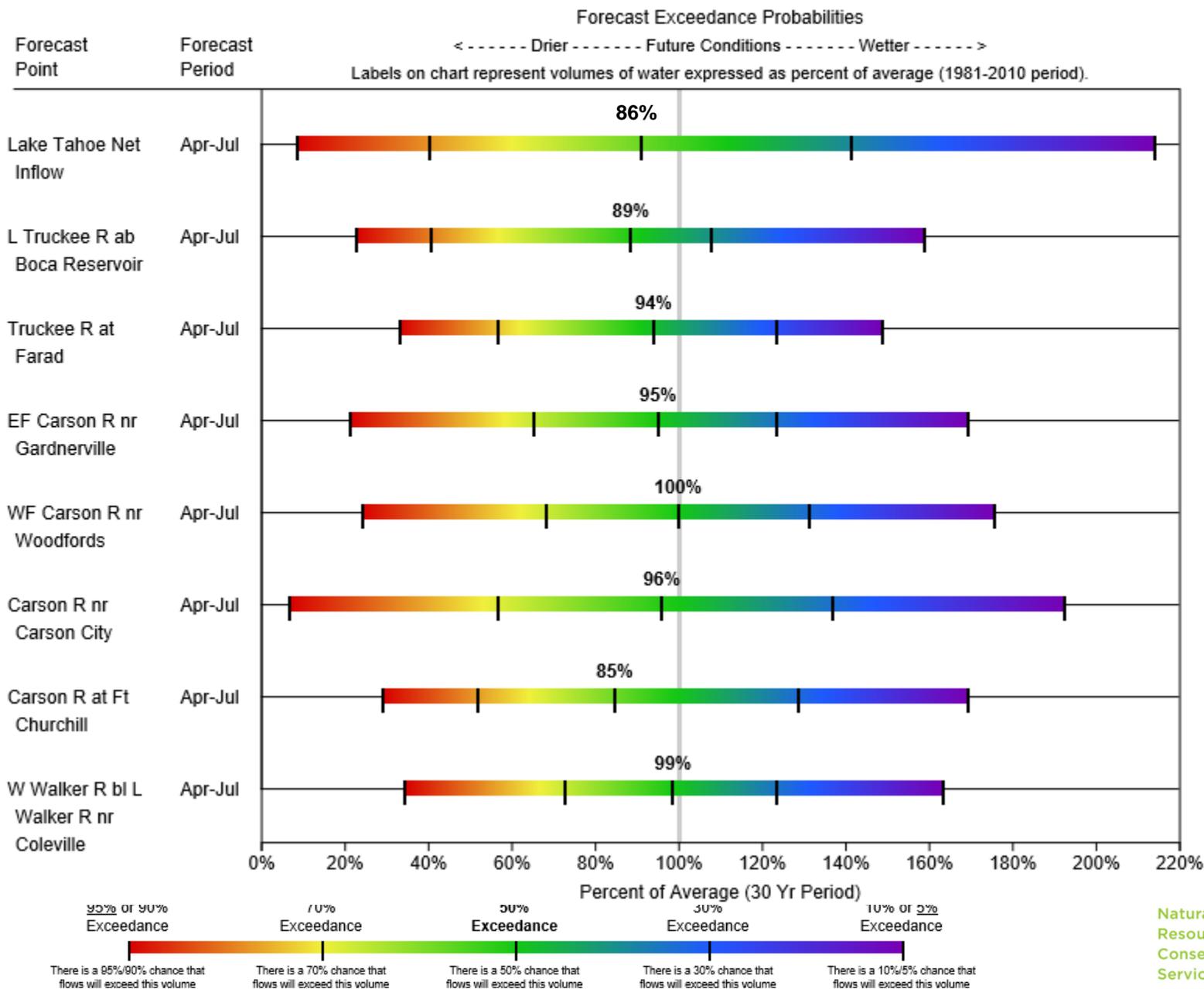
Water Year (Oct 1) to Date Precipitation Basin-wide Percent of 1981-2010 Average



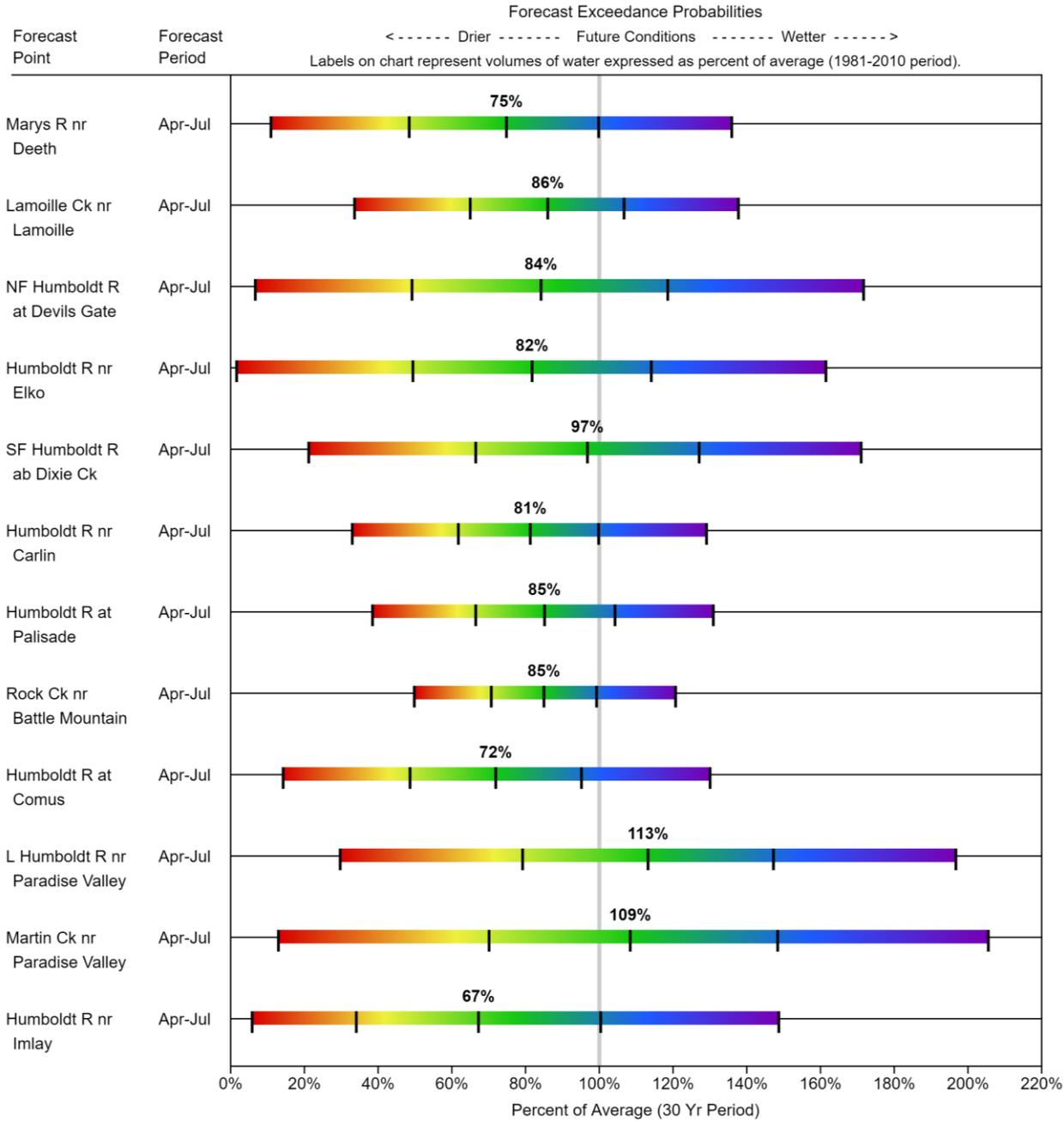
\* Data unavailable at time of posting or measurement is not representative at this time of year

# When we get it, we GET IT 3 weeks of winter





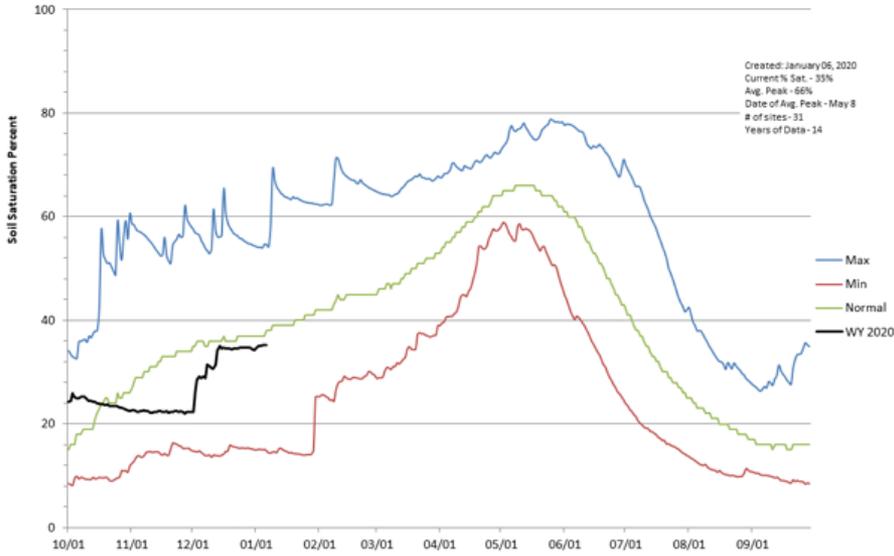
### Humboldt River Summary Water Supply Forecasts January 1, 2020



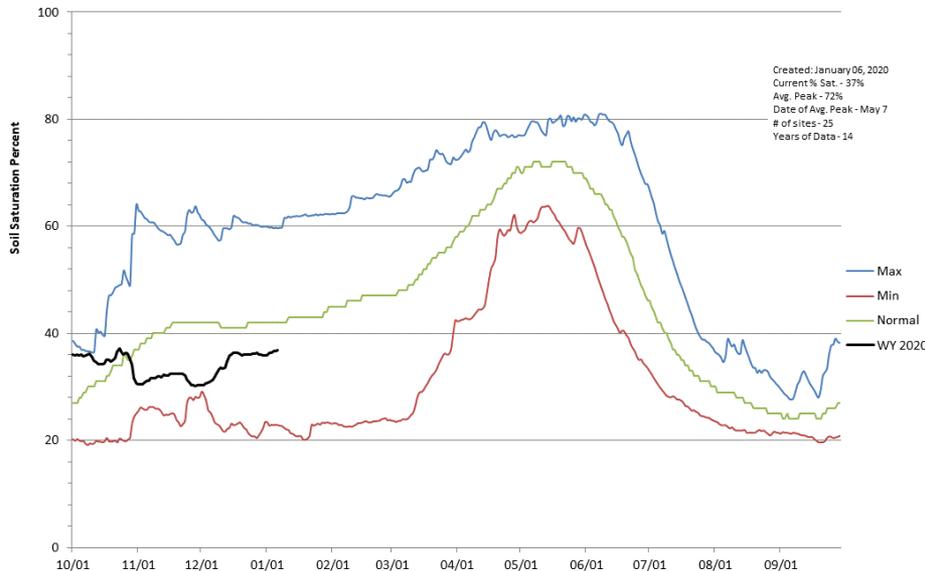
# Something to watch:

## Basin Soil Moisture is drier than average, but high elevation sites are very dry

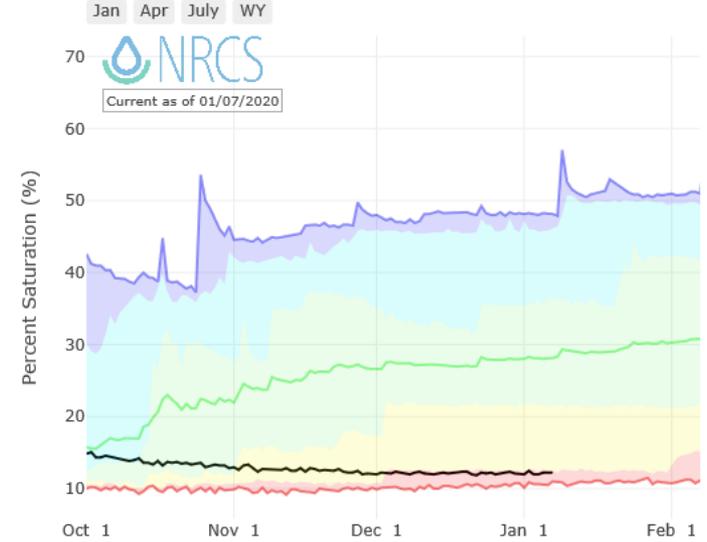
Eastern Sierra (Central Lahontan) - Soil Saturation



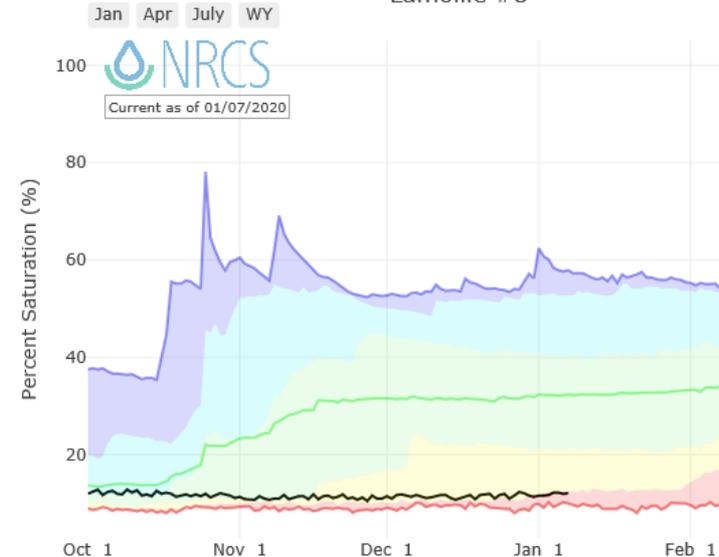
Humboldt River above Imlay - Soil Saturation



Depth Averaged Soil Saturation at Ebbetts Pass



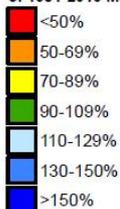
Depth Averaged Soil Saturation at Lamoille #3



# 2019 Recap & Forecast Review

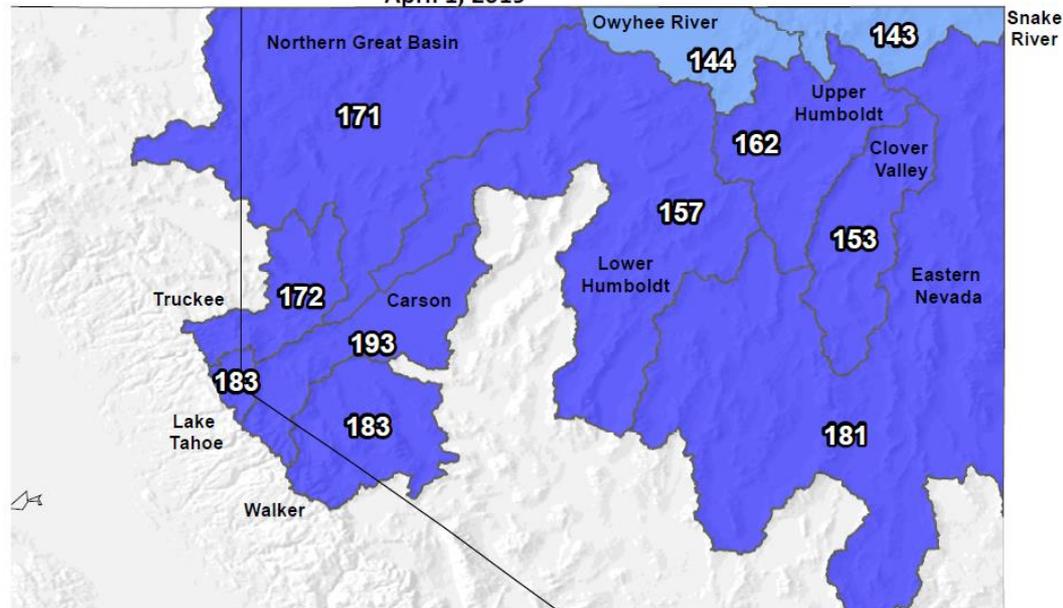
**Apr 1 Snow  
~160-190%**

1st of Month Snow  
Water Equivalent  
Basin-wide Percent  
of 1981-2010 Median



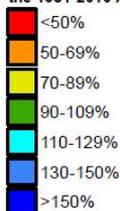
*Provisional data  
subject to revision*

Nevada & Eastern Sierra  
Percent of Median Snowpack  
April 1, 2019



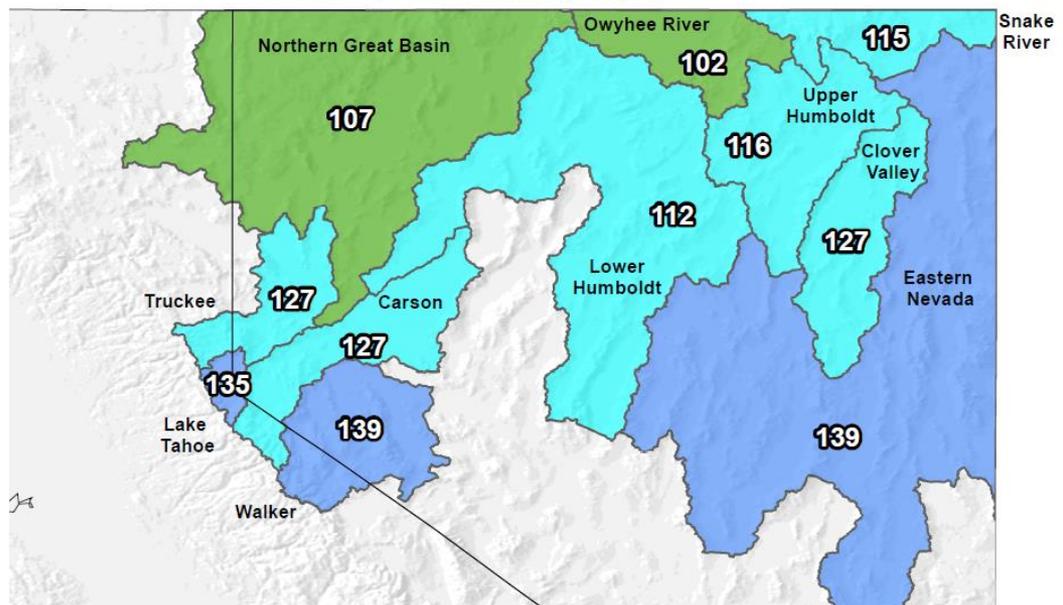
**Apr 1 WY Precip  
~110-140%**

Basin-wide  
Water Year  
Precipitation to Date  
as a Percent of  
the 1981-2010 Average

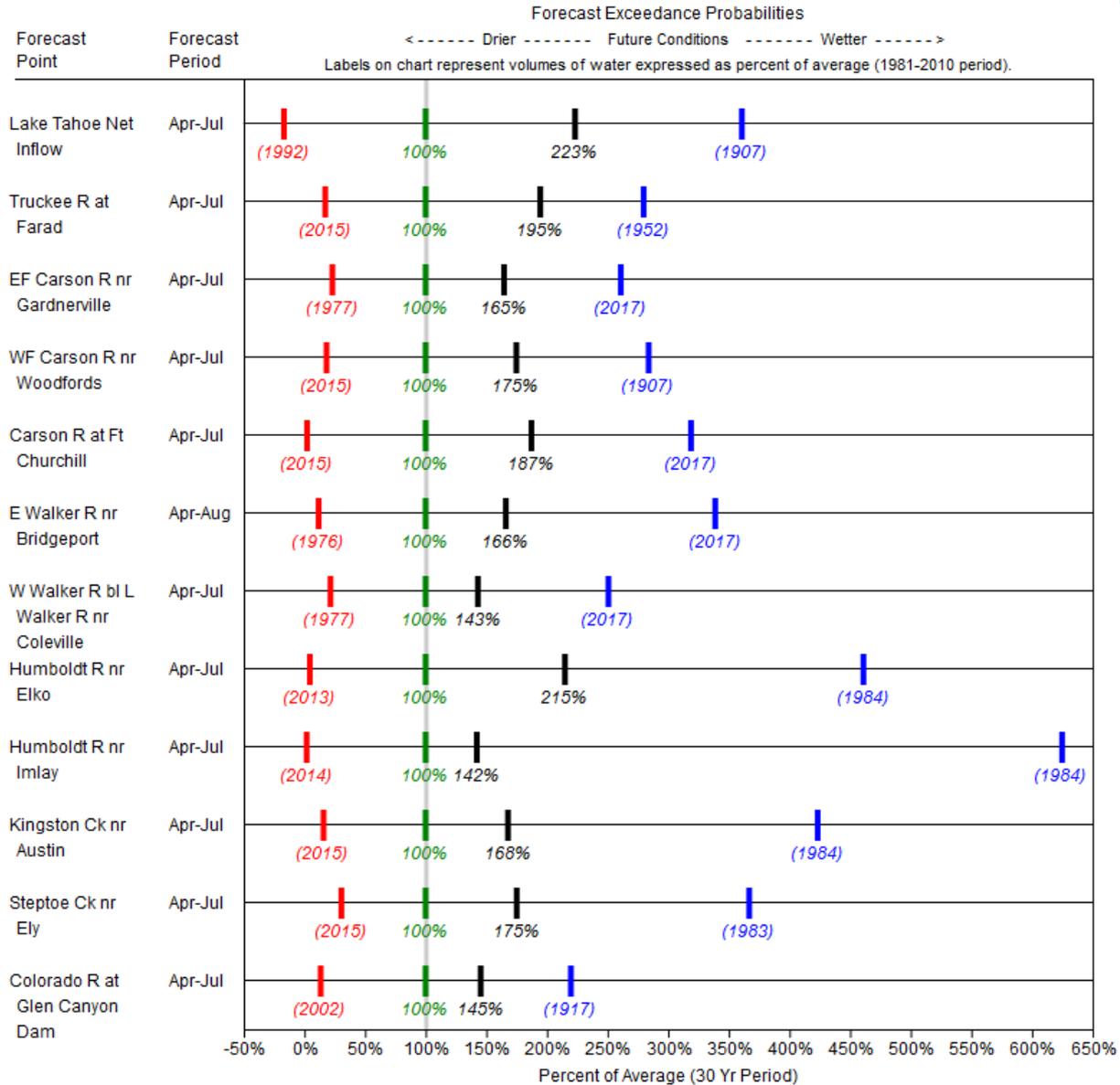


*Provisional data  
subject to revision*

Nevada & Eastern Sierra  
Water Year to Date Precipitation  
October 1, 2018 through April 1, 2019



**Observed  
April-July  
streamflow  
was  
~140-220%  
of average**



Period of Record Minimum Streamflow KAF (Year)

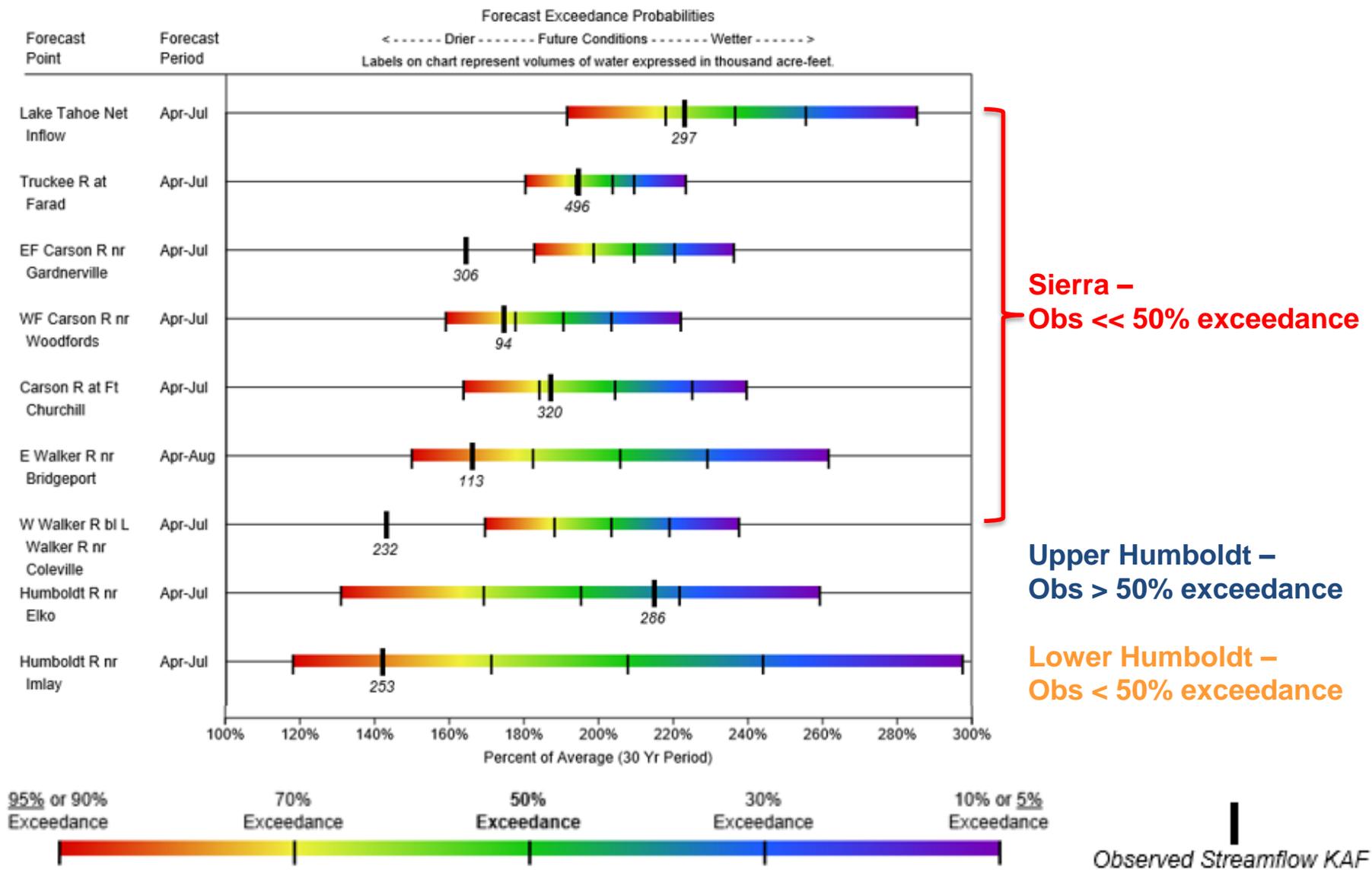
1981-2010 Normal Streamflow KAF

Observed Streamflow KAF

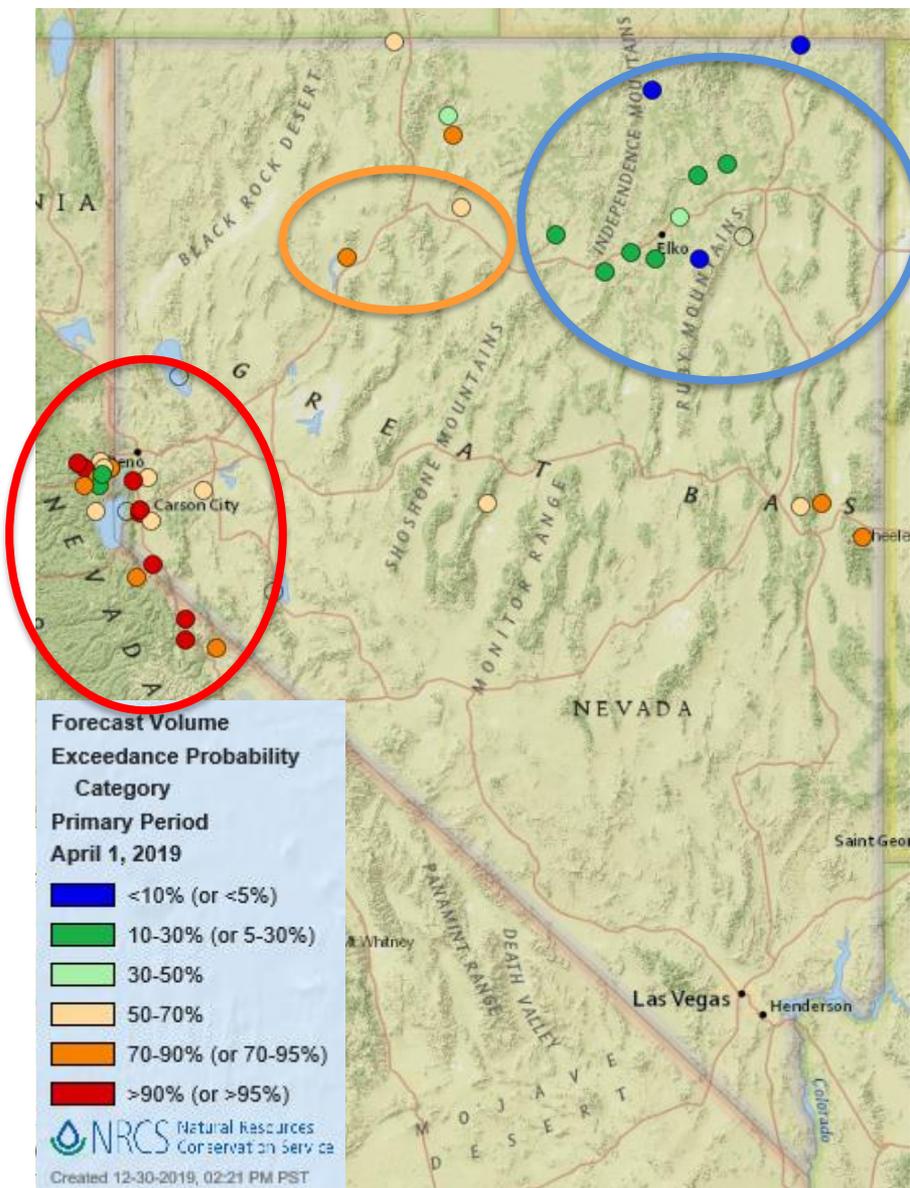
Period of Record Maximum Streamflow KAF (Year)



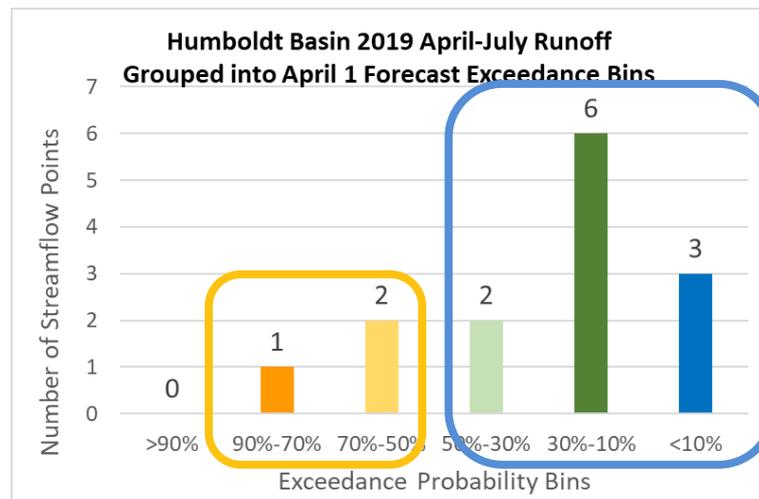
# How did observed streamflow compare with forecasts?



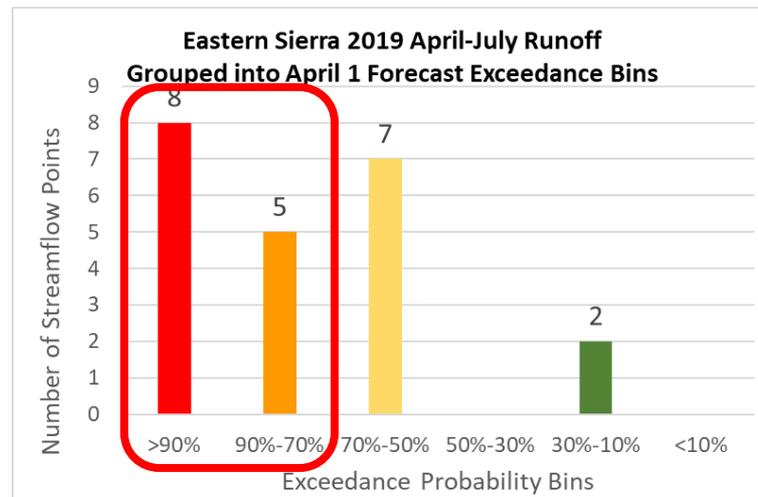
# 2019 Forecast Results



## Upper Humboldt – Obs > 50% exceedance



## Lower Humboldt – Obs < 50% exceedance



## Sierra – Obs << 50% exceedance

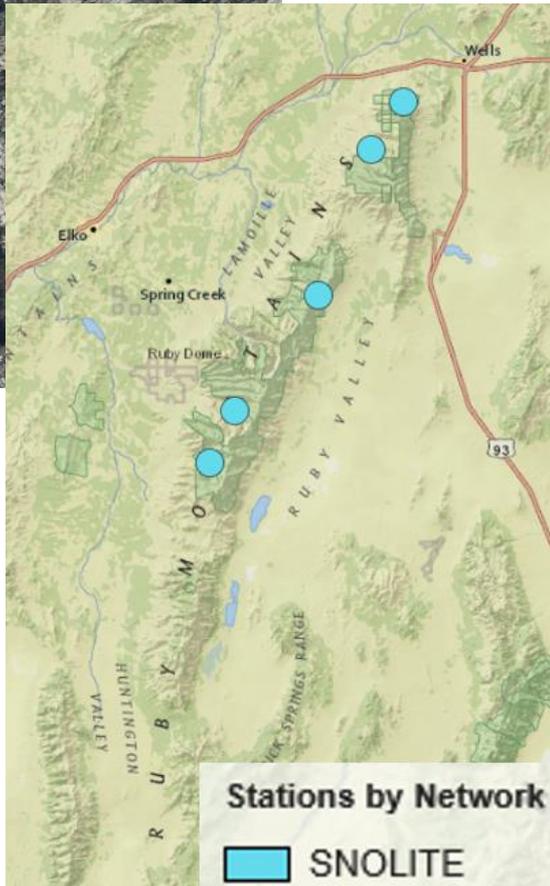




What else boosted flows in the Upper Humboldt?

**July 1, 2019  
Lamoille Canyon  
Ruby Mtns**

**Lots of late season snow melting in early July**





United States Department of Agriculture

# July 1, 2019 Liberty Pass, Head of Lamoille Canyon flying over pass into SF Humboldt tributaries



# Humboldt nr Imlay – 2019 Daily Streamflow



## Why didn't the water show up at Imlay?

Observed A-J was 253kaf vs 50% exceedance forecast for 370kaf

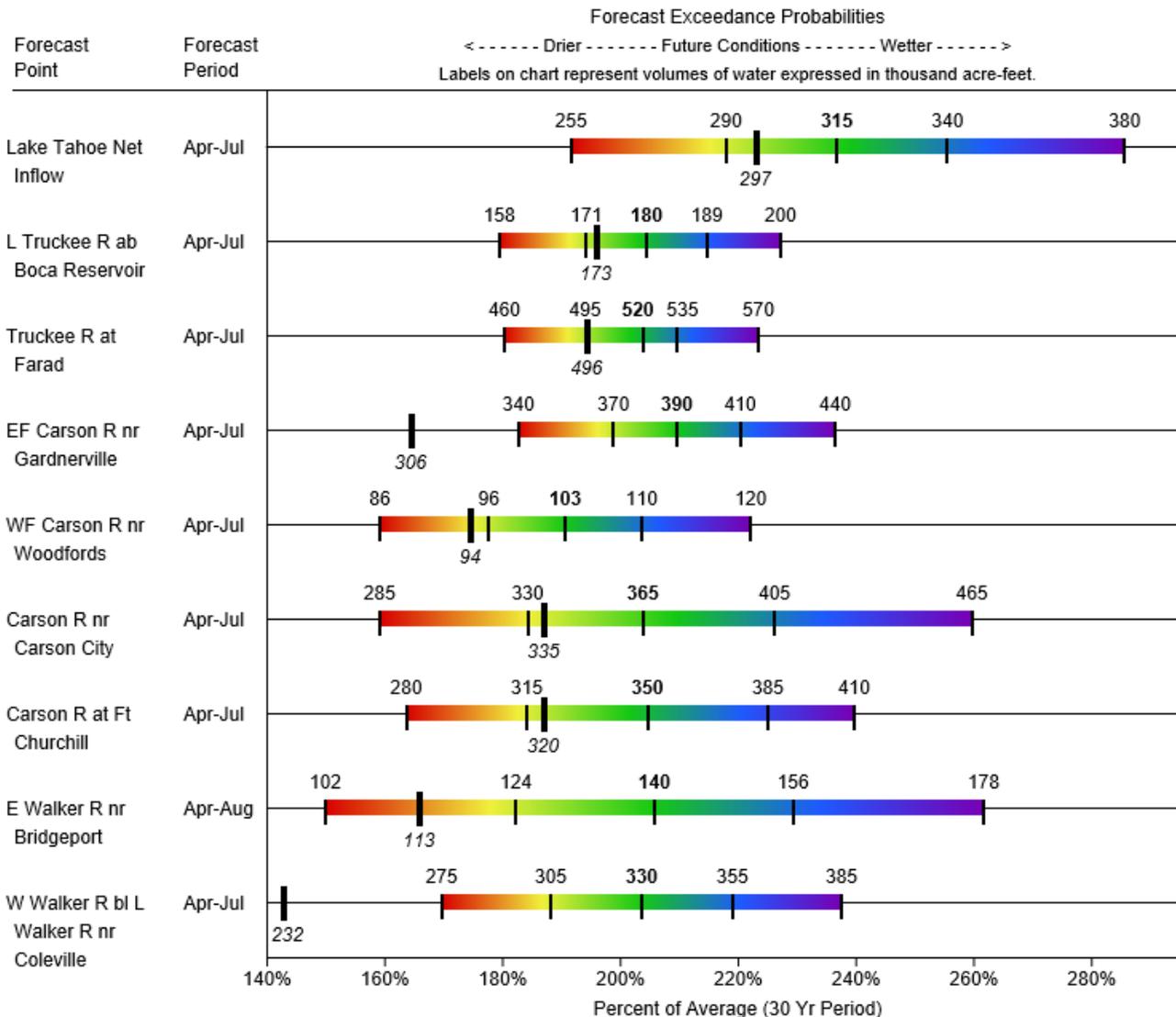
Cool May could have caused overall runoff to be less efficient at pushing water through the length of the river.

Some Apr-Jul runoff may have lagged into August due to travel times.

# Eastern Sierra Basin Summary

## Water Supply Forecasts

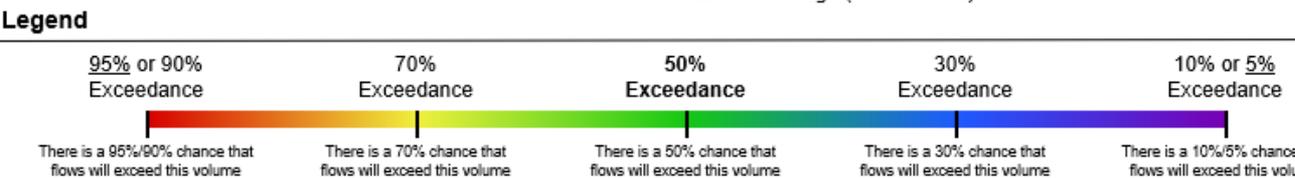
April 1, 2019



**Eastern Sierra  
Observed A-J Runoff  
143-223% of average**

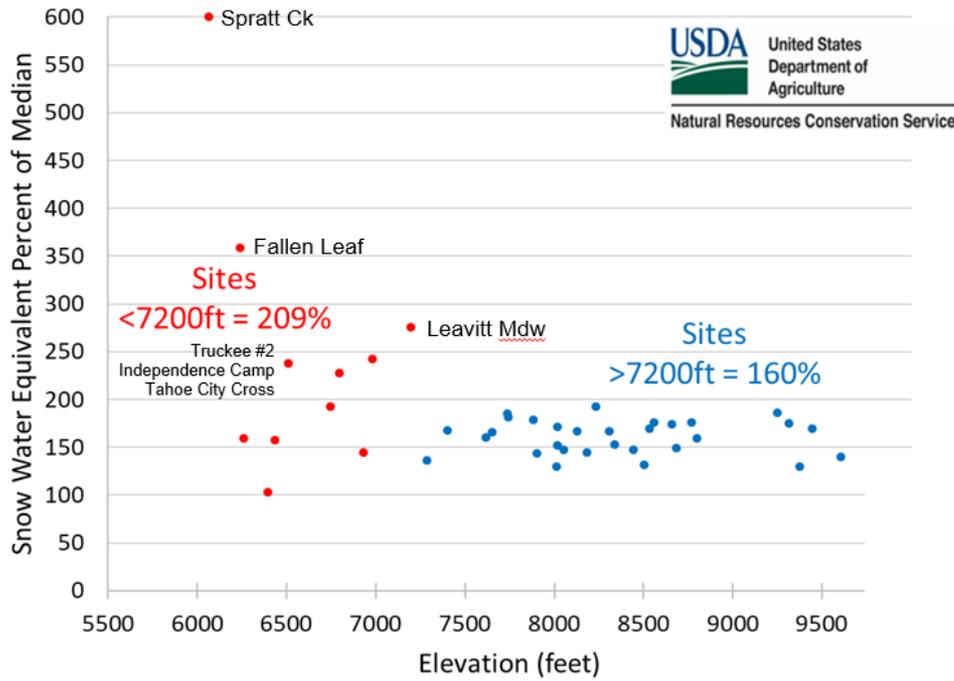
Apr-Jul precip near average but,

Observed flows near 70% or 90% exceedance forecasts



## State of Nevada and the Eastern Sierra March 11, 2019 Snowpack Percent of Median vs Elevation

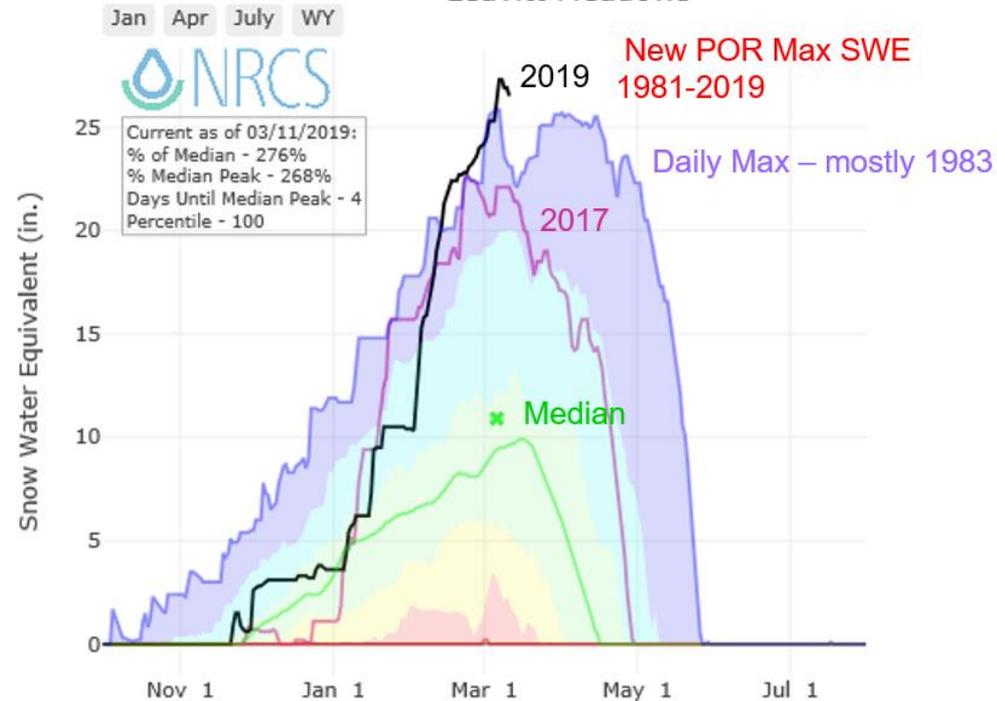
(Data based on SNOTEL data)



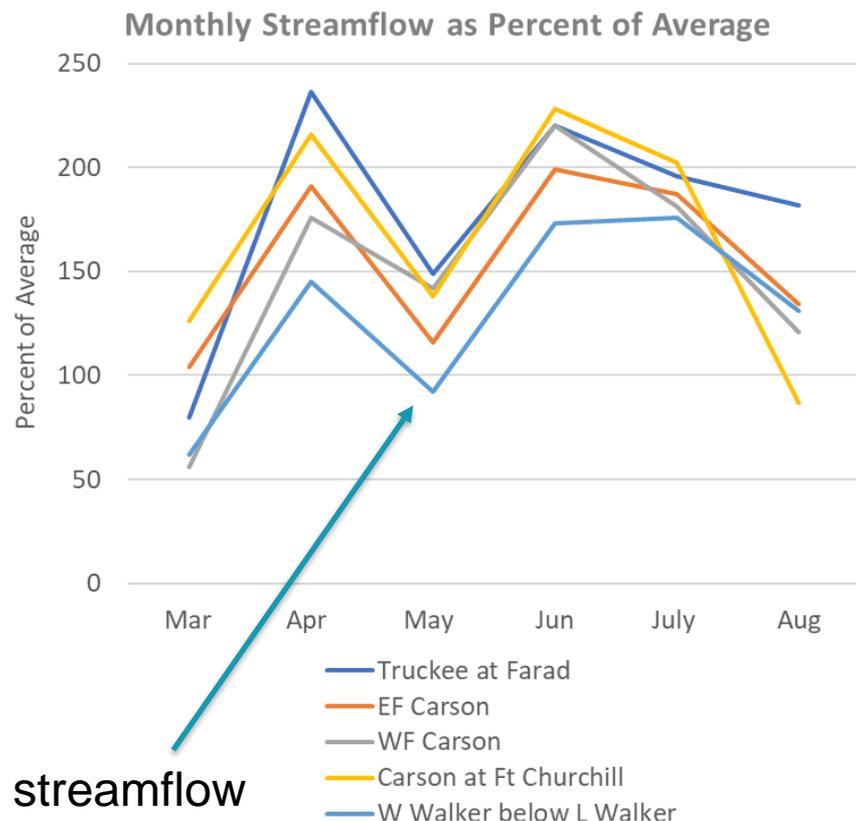
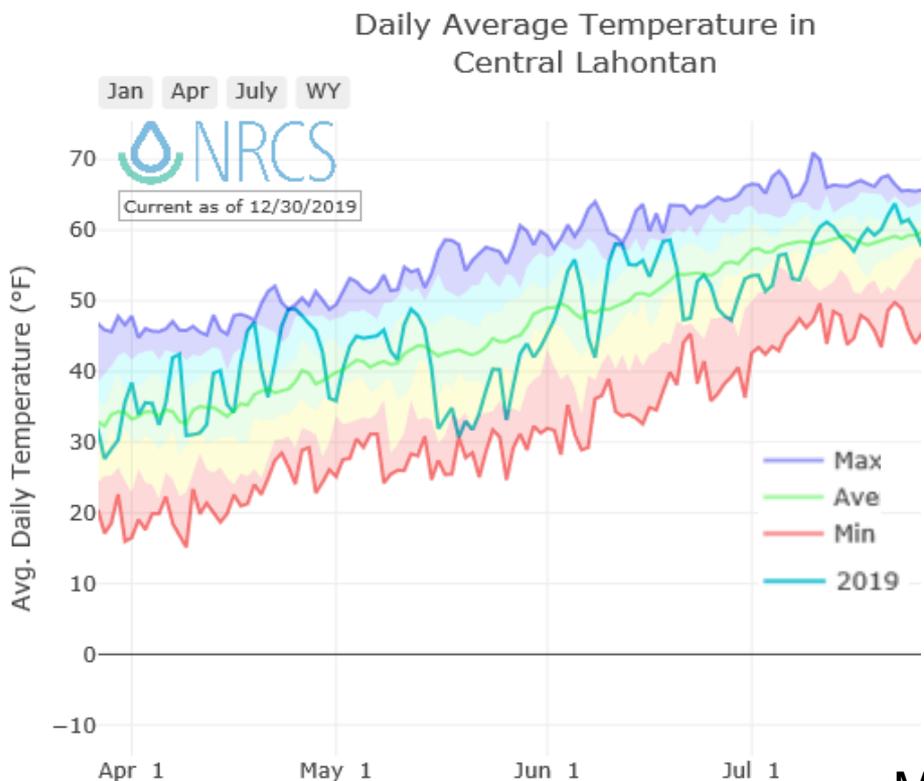
Possible explanation:  
Unusually Large Snowpack  
at Mid-Elevations caused  
inflated forecasts



### West Walker Basin Elev. 7198ft Snow Water Equivalent at Leavitt Meadows



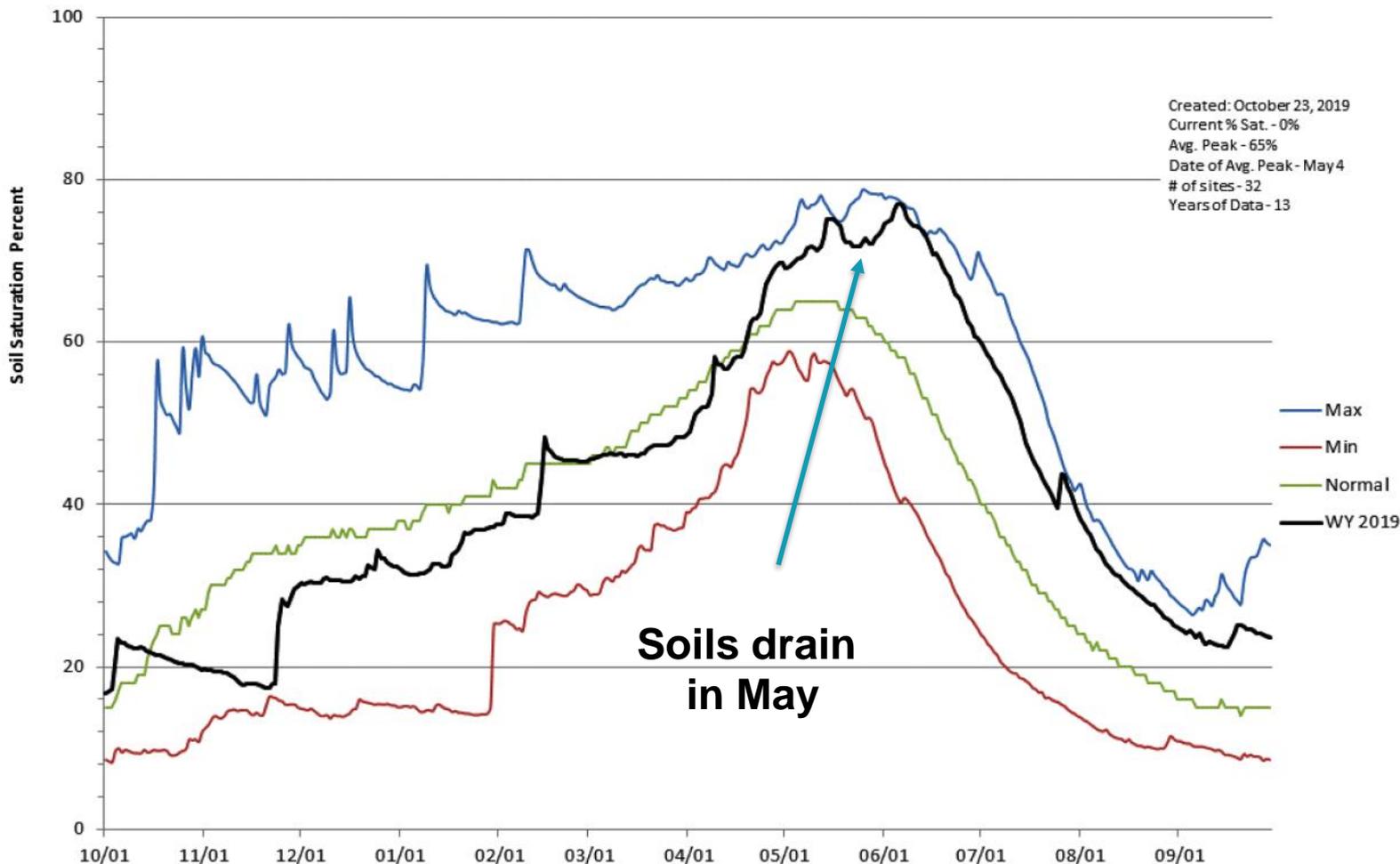
# Other factors: See-sawing spring temps & cold May caused inefficient runoff



May streamflow  
less as % of  
average than  
Apr, Jun, Jul

# Cold May allowed soils to drain, reducing runoff efficiency during melt.

## Eastern Sierra - Soil Saturation





# Summary

In 2020 we need an above median snowpack or a wet spring for average April-July streamflow.

Beware of dry soils at higher elevations, this may reduce runoff efficiency.

Last year dry soils in Eastern Nevada may have affected runoff efficiency.  
*(See 2019 Forecast Review on the NV Snow Survey webpage for details)*